United States Department of Agriculture

Forest Service RO

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Reply To: 3420 Date: MAY 03 1991

Subject: Needle tip dieback on Douglas-fir seedling at Chico Tree Improvement Center (Report No. R91-08)

To: Forest Supervisor, Mendocino National Forest

In the summer of 1990, Cathy Stanko, Greenhouse Manager, Chico Tree Improvement Center, reported the occurrence of scattered dead and dying 1.0 Douglas-fir seedlings. About 500-600 seedlings were diseased and had to be culled. James Allison, Plant Pathologist, FPM examined the dead and dying Douglas-fir seedlings and transported some back to the laboratory in San Francisco for isolation and identification of possible causal agents. In addition, some healthy seedlings were transported to the Regional Office.

The symptoms on the seedlings were very characteristic of symptoms reported in the literature as caused by various Fusarium spp, especially F.oxysporum. The seedlings exhibited symptoms that ranged from slight chlorosis to complete necrosis of needles. The necrosis of the stem was accompanied by twisting and bending of the leader.

The dead and dying seedlings were removed from their container, thoroughly washed to remove growing medium, and aseptically severed and incubated on Komada's medium.

Isolations made from dead and dying seedling roots revealed the presence of Fusarium oxysporum. Isolations made from symptomless seedlings also revealed F. oxysporum. The result of this examination seem to indicate that there are a number of different strains of F.oxysporum. Some of the strains, even though they readily colonize cortical cells of seedling roots (Bloomberg, 1966; James and Gilligan, 1988, and James, et al), do not necessarily cause disease symptoms. These Fusarium spp. can became active pathogens on stressed hosts or remain inactive for long periods of time (Bloomberg, 1971, 1973.)

We need to thoroughly investigate the role of environmental conditions such as moisture and temperature on pathogenicity of Fusarium spp. in Douglas-fir. In other words, we should investigate and identify factors that contribute to disease expression in conifer seedling so we can develop effective control measures. Chico Tree Improvement Center, Forest Pest Management, and Pacific Southwest Station-Berkeley are currently conducting a cooperative Mycorrhizal study in containerized sugar pine. Hopefully, the results of this study will assist us in developing control measures which will reduce losses caused by pathogenic Fusarium spp.

If there are any questions regarding this report, please feel free to contact James Allison at (415) 705-2565.)

John K Kiegiens

For JOHN NEISESS, FPM Program Leader
State and Private Forestry

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